BUDGETARY EFFECTS OF DEPLOYING A STRATEGIC DEFENSE SYSTEM, 1993-2002

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This memorandum responds to a request by the Special Task Force on the Strategic Defense Initiative of the Democratic Caucus of the House of Representatives. It was prepared by Bonita J. Dombey, under the general supervision of Robert F. Hale and John D. Mayer, Jr. Questions regarding the analysis may be addressed to Ms. Dombey (226-2900).

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This Congressional Budget Office (CBO) Staff Memorandum analyzes the longer-term effects on budgets--mostly in the 1990s--of a commitment to deploy a Strategic Defense System (SDS). It is too soon to estimate these future costs with confidence. Nonetheless, a notion of potential budget requirements can be developed if certain assumptions are made.

The Administration has estimated the total costs of developing and deploying the first phase of an SDS. But the Administration has also stated that, because its goals for an SDS would be only partially met by deployment of this first phase, it intends to develop follow-on phases at the same time it deploys the initial phase of the SDS. Thus, budget estimates must consider not just the cost of the first phase, but also the cost of parallel development and deployment of several phases of an SDS. Administration estimates of the costs of follow-on phases are not available. The assumption could be made that these follow-on phases will cost at least the same amount as the first phase. Under these assumptions (referred to as Case 1), costs could be substantial. Annual costs in some years in the 1990s could exceed the total funds now devoted to all strategic nuclear forces.

This analysis also considers the effects of alternative assumptions: Cases 2 and 3 explore the effects on budget requirements of delays in the pace of development and deployment of follow-on phases of an SDS, and lower costs for these follow-on phases. If the assumptions in Case 2 or Case 3 prove correct, annual costs for an SDS could be significantly lower than those estimated in Case 1.

There are important limitations associated with these three alternative budget estimates. The results relate only to costs and do not examine other questions such as the cost-effectiveness of an SDS. Moreover, the wide range of Administration estimates for the cost of the initial phase of an SDS emphasizes the uncertainty associated with the current estimates, and assumptions about costs of follow-on phases are even more speculative. Nor do cost estimates in this analysis consider the effects that an SDS could have on requirements for and costs of other military forces, including costs of strategic offensive forces, which may be lower, or costs of defenses against weapons such as bombers and cruise missiles, which may be higher. Numerous other assumptions that permit estimates of annual costs are specified for each case in the following analysis.

CASE 1: ADMINISTRATION ASSUMPTIONS ABOUT TIMING AND COSTS FOR PHASE I

Case I provides an estimate of the budget effects in the 1990s of an SDS developed and deployed under Administration assumptions about timing and Administration estimates of the costs of the first phase of the SDS.

Timing. The Administration has established a phased plan to achieve its goals for the SDS. In recent years, it has been exploring concepts to determine their feasibility. Several concepts have now moved into a more advanced phase involving the demonstration and validation of specific approaches. Under Administration plans, by the mid-1990s, these approaches--if successful--would proceed into a phase called full-scale engineering development that would develop working systems. The systems would then be deployed in the later 1990s and would constitute Phase I of an SDS. Phase I is designed to provide limited protection against a large nuclear attack by the Soviets, but it is not intended to be sufficiently leak proof to avoid substantial destruction of property and the population.

Parallel with efforts on Phase I, the Administration plans the development of a Phase II system that would provide greater protection against a Soviet attack. Protecting the population--and not some more limited objective--remains the key Administration goal. Lieutenant General Abrahamson--director of the Strategic Defense Initiative Office (SDIO)--has consistently reiterated this point. For example, in a recent statement before the House Armed Services Committee, General Abrahamson said that "Neither the Secretary of Defense nor the President has ever accepted the notion of a defense that would protect only our national command facilities or retaliatory forces . . . The type of defense we are seeking is capable of providing protection for our entire national territory, including the general population, and to work on theater defense for our allies as well."

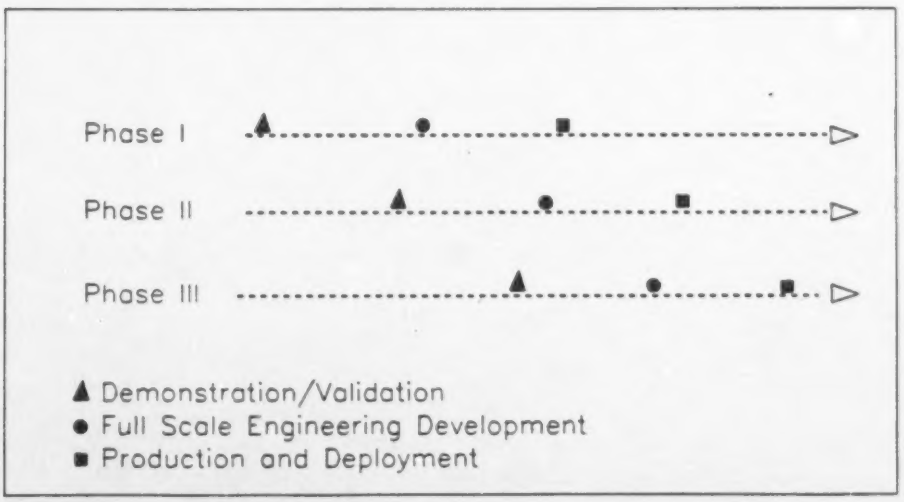
The Administration may also begin development and deployment of Phase III during the years addressed by this analysis. No prediction has been made as to the number of phases that would be required before the Administration could meet its goal of protecting the population from the effects of a large nuclear attack. It is clear, however, that substantial capability would be required beyond that available from Phase I. Thus, it is quite possible that more than two phases could be required.

The phases are timed, under current Administration plans, to reduce the risk of deploying an early phase at substantial expense only to discover that the key goal--protecting U.S. and allied populations--cannot be achieved because of limited technology or budgets. Thus, current Administration policy is that each phase is to be only one budgetary

"milestone" behind the phase that precedes it (see Figure 1). (Budgetary milestones indicate points at which key decisions must be made by the Administration.) For example, the elements of Phase I have recently been approved for the first milestone--demonstration and validation of important technologies. According to the Administration's phased deployment concept, before Phase I is approved for its second milestone--full-scale development of a system--the elements of Phase II must have passed their first milestone, and so on. This policy was used in Case 1 to determine when each of the various phases would begin. Table 1 shows the detailed assumptions.

Total Cost. SDIO has estimated the development and acquisition costs of Phase I at between $75 billion and $150 billion; the range reflects uncertainty about technical requirements and design trade-offs for hardware that has not yet been developed. SDIO has not publicly estimated the cost of later phases of an SDS. In Case 1, CBO assumed that development and acquisition of each phase would cost the same amount in real dollars as development and acquisition of Phase I.

FIGURE 1. DEVELOPMENT OF THE STRATEGIC DEFENSE SYSTEM



SOURCE: Congressional Research Service based on SDIO data.

TABLE 1. TIMING OF SDS PHASES UNDER ALTERNATIVE CASES

Milestone	Case 1	Cases 2 and 3
Continuing Technology Development Through Demonstration/Validation	All Years	All Years
Full-Scale Development: Phase I	1994	1994
Acquisition: Phase I	1996	1997
Full-Scale Development: Phase II	1996	1999
Acquisition: Phase II	1998	2002
Full-Scale Development: Phase III	1998	2004
Acquisition: Phase III	2000	2007

SOURCE: Congressional Budget Office estimates.

Results. Table 2 illustrates the effects of these assumptions on costs in years when initial deployment of an SDS would be occurring. (These estimates include costs of launching components of Phase I into space but do not include costs of operations and support for Phase I, which CBO did not attempt to estimate.) 1/

Average annual costs over the 1993-1997 period range from $17 billion to $28 billion (all costs are in 1988 dollars of budget authority). The range represents costs based on the lower and upper bound respectively of SDIO's estimate of Phase I costs--$75 billion to $150 billion. Average annual costs in the later period (1998 through 2002) range from $33 billion to $63 billion.

Perspective on the magnitude of these costs can be gained by comparing them with existing defense budget totals, such as the total for all strategic nuclear forces. The budget for all strategic forces, of which strategic defense is a part, grew in real terms by an average of 19 percent

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1. To derive the annual costs provided in Table 2, CBO assumed that total costs for each milestone were divided evenly over the years available to complete each task. In reality, costs would build to a peak in the middle of each milestone period and tail off thereafter, probably resulting in both smaller and larger annual totals than those shown.

TABLE 2. COSTS OF AN SDS UNDER CASE 1: ADMINISTRATION ASSUMPTIONS ABOUT TIMING AND COSTS FOR PHASE I
(In billions of 1988 dollars of budget authority)

Milestone	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Continuing Technology Development Through Demonstration/ Validation a/	8	8	8	8	8	8	8	8	8	8
Full-Scale Development: Phase I b/										
Low Estimate	--	5	5	5	--	--	--	--	--	--
High Estimate	--	11	11	11	--	--	--	--	--	--
Acquisition: Phase I c/										
Low Estimate	--	--	--	9	9	9	9	9	--	--
High Estimate	--	--	--	21	21	21	21	21	--	--
Full-Scale Development: Phase II d/										
Low Estimate	--	--	--	5	5	5	--	--	--	--
High Estimate	--	--	--	11	11	11	--	--	--	--
Acquisition: Phase II d/										
Low Estimate	--	--	--	--	--	9	9	9	9	9
High Estimate	--	--	--	--	--	21	21	21	21	21
Full-Scale Development: Phase III d/										
Low Estimate	--	--	--	--	--	5	5	5	--	--
High Estimate	--	--	--	--	--	11	11	11	--	--
Acquisition: Phase III d/										
Low Estimate	--	--	--	--	--	--	--	9	9	9
High Estimate	--	--	--	--	--	--	--	21	21	21
Totals										
Low Estimate	8	13	13	28	23	37	32	41	27	27
High Estimate	8	20	20	52	40	72	61	81	49	49

SOURCE: Congressional Budget Office estimates.

NOTES: Dashes indicate years in which no funding is assumed for a particular phase. Totals may not add because of rounding.

a. Assumed to continue at 1993 level.
b. Development assumed to constitute 25 percent of SDIO Phase I estimate, net of demonstration/validation funds.
c. Acquisition assumed to constitute 75 percent of SDIO Phase I estimate, net of demonstration/validation funds.
d. Assumed to be same as for Phase I.

per year between 1980 and 1984--the early years of the Administration's strategic modernization program. At its peak in 1984, the budget for strategic forces was about $40 billion (in 1988 dollars) and made up about 14 percent of the defense budget. Thus, in some years in the late 1990s, the costs of deploying an SDS could exceed total funds allocated to all strategic forces during a peak year of funding.

CASES 2 AND 3: ALTERNATIVE ASSUMPTIONS ABOUT TIMING AND COSTS

Under current Administration plans, the budgetary impact of an SDS would clearly be substantial. Spending of this magnitude could be particularly difficult to accommodate if total funds available for defense continue to be limited, as in recent years. Given these results, CBO examined two alternative cases that reduce budgetary effects in the 1990s.

Case 2 abandons the Administration goal of keeping subsequent SDS phases no more than one budgetary milestone behind the previous phase (see Table 1). Abandoning this goal has disadvantages, since at the time of a particular phase's deployment it would leave decisionmakers with less knowledge about when or whether more advanced technology would be available that could allow an SDS to achieve the goal of protecting the population against nuclear attack. The approach in Case 2, therefore, raises the risk of deploying an earlier phase and finding that the key goal cannot be attained without extensive delays or large increases above planned costs.

Case 2 does, however, reduce costs during years when initial deployment is occurring. Average annual costs for 1993 through 1997 could range from $13 billion to $19 billion, given Administration estimates for the cost of Phase I. Average annual costs for the 1998-2002 period could range from $21 billion to $36 billion, again assuming similar costs for later phases.

Case 3 assumes that the delay in the SDS phases will be the same as in Case 2, and that subsequent phases will be less costly than earlier phases. On the one hand, many analysts would predict that the more advanced technologies required for later phases would result in greater expense, not less. On the other hand, reductions in cost could occur if, for example, some systems needed by a subsequent phase (perhaps those for battle management) were developed during the earlier phase, or if a particular technology (such as that for sensors) had already been developed. For the sake of illustration, Case 3 assumes that development and acquisition of each subsequent phase costs one-third less in real terms than the preceding phase. Under Case 3, average annual costs for the 1993-1997 period would be the same as in Case 2: average annual costs for the 1998-2002 period could range from $19 billion to $32 billion.

CONCLUSION

In the absence of large increases in the defense budget, funding an SDS under the Administration assumptions of Case 1 (under the assumption of similar costs for later phases) would require substantial reallocations of resources from other strategic nuclear programs and from conventional forces. The lower estimates for Cases 2 and 3, however, may not require as major a change in resource allocation (see Table 3). By the mid-to-late 1990s, Administration plans call for most large strategic modernization programs to have been completed (including the rail version of the MX missile, the Trident II missile, and perhaps the Stealth bomber and the Trident submarine program). Funding for strategic programs other than an SDS might, therefore, fall to lower levels. The nadir of spending for strategic forces occurred in 1979, when the strategic budget totaled only about $18 billion (in 1988 dollars). If the total annual budget for strategic forces in the 1990s remained at its recent peak of $40 billion-- which occurred in 1984--but spending on strategic forces other than those for SDS declined to the 1979 low, about $22 billion per year would become available. Under SDIO's low cost assumptions for Phase I, and the delayed timing

TABLE 3. AVERAGE ANNUAL COSTS OF AN SDS UNDER ALTERNATIVE TIMING AND COST ASSUMPTIONS
(In billions of 1988 dollars of budget authority)

Alternative	1993-1997	1998-2002
Case 1		
Low Estimate a/	17	33
High Estimate b/	28	63
Case 2		
Low Estimate	13	21
High Estimate	19	36
Case 3		
Low Estimate	13	19
High Estimate	19	32

SOURCE: Congressional Budget Office estimates.

a. Derived from SDIO Phase I estimate of $75 billion.
b. Derived from SDIO Phase I estimate of $150 billion.

assumption for Case 2 and other assumptions of Case 3 that reduce cost estimates, this funding would be sufficient to pay for the initial deployment of an SDS without large reallocations of funds from other programs or strong growth in the total defense budget.

Nevertheless, under SDIO's high cost assumptions for Phase I, in all three cases the available funding would not be sufficient to deploy an SDS without reallocations of funding or growth in the total defense budget. Moreover, total strategic funding in 1988 had fallen to about $9 billion below its 1984 peak, suggesting that future funding may not be at that peak level. Finally, the assumptions that lead to $22 billion of available funding assume that none of the funds that become available as strategic modernization is completed are allocated to modernizing other military forces or to reducing the federal deficit. Thus, this analysis provides perspective on the possible costs of deploying an SDS, but does not support any firm conclusion about the significance of the budgetary effects.